Amendments to the Title of the Specification:

Please replace the title of the invention with the following title:

- -DIFFRACTIVE INTERFEROMETRIC OPTICAL DEVICE FOR MEASURING SPECTRAL PROPERTIES OF LIGHT- -

Amendments to the Specification:

Please replace paragraph [0037] with the following replacement paragraph:

[0037] Figure 1 illustrates an **extremely compact arrangement of the** apparatus of the invention **with the optical components being integrated in a monolithic glass block,** according to one embodiment;

Please replace paragraph [0038] with the following replacement paragraph:

[0038] Figure 2 illustrates an apparatus of the invention **that uses a separate beam splitter (S) for the division of the amplitude of the waves and two dispersive elements (G1, G2) in the arms of the interferometer,** according to one embodiment;

Please replace paragraph [0039] with the following replacement paragraph:

[0039] **Figure 3** illustrates an apparatus of the invention **that uses a wavefront splitter based on two optical gratings(G1,G2) for the division of the wavefront while said gratings (G1,G2) at the same time are used as spectrally dispersive elements,** according to one embodiment;

Please replace paragraph [0040] with the following replacement paragraph:

[0040] **Figure 4** illustrates an apparatus of the invention **that couples a single spatial mode of an incoming light field and splits a wavefront of the incoming single spatial mode of light in to a multitude of subfields showing different dependencies on wavelength,** according to one embodiment;

Please replace paragraph [0041] with the following replacement paragraph:

[0041] **Figure 5** illustrates an apparatus of the invention **in which a plurality of subfields is generated and superimposed using an optical resonator,** according to one embodiment;

Please replace paragraph [0042] with the following replacement paragraph: .

[0041] **Figure 6** illustrates an apparatus of the invention **in which a semitransparent mirror (S) and a diffractive grating (G) are realized on two surfaces of a prism,** according to one embodiment;

Please replace paragraph [0043] with the following replacement paragraph:

[0043] **Figure 7** illustrates an apparatus of the invention **in which a single spatial optical mode is coupled in and split into subfields while simultaneously introducing variations of the wavefront of the subfields depending on wavelength,** according to one embodiment;

Please replace paragraph [0044] with the following replacement paragraph:

[0041] **Figure 8** illustrates an arrangement of the apparatus of the invention **in which a single spatial optical mode is coupled in and split into subfields while simultaneously introducing variations of the wavefront of the subfields depending on wavelength,** according to one embodiment;

Please replace paragraph [00092] with the following replacement paragraph:

[00092] In fact the incoming wave is a single spherical spatial mode. The ~~angel~~**angle** of diffraction at the planar grating ~~is depending~~ **depends** upon the wavelength. The direction of propagation of the diffracted wave therefore will depend on the wavelength. Further the diffracted wave is also distorted**,** i.e. changed in shape related to the shown geometry**.** ~~:~~In fact the **width of the** diffracted field **is** has a stretched width.

Please replace paragraph [0185] with the following replacement paragraph:

[000185] In fact the incoming wave is a single spherical spatial mode. The ~~angel~~**angle** of diffraction at the planar grating ~~is depending~~ **depends** upon the wavelength. The direction of propagation of the diffracted wave therefore will depend on the wavelength. Further the diffracted wave is also distorted**,** i.e. changed in shape related to the shown geometry**.** ~~:~~In fact the **width of the** diffracted field **is** has a stretched width.

Please replace paragraph [000190] with the following replacement paragraph:

[000190] A preferable embodiment to realize a optical sensor to quantify certain spectral properties of incoming light is shown in Fig. 7**8**.

Please replace paragraph [000200] with the following replacement paragraph:

[000200] The incoming wave is a single spherical spatial mode. The ~~angel~~ **angle** of diffraction at the planar grating ~~is depending~~ **depends** upon the wavelength. The direction of propagation of the diffracted wave therefore will depend on the wavelength. Further the diffracted wave is also distorted**,** i.e. changed in shape related to the shown geometry**.** ~~:~~In fact the **width of the** diffracted field **is** has a stretched width.

Please replace paragraph [00085] with the following replacement paragraph:

[00085] ~~Said~~ **The** incoming single spatial mode of light is directed to a grating (G). The grating is used as a beam splitter **causing the** ~~and said~~ incoming single spatial mode **to be split according to amplitude into two partial fields** ~~is splitted by amplitude into two sub fields~~.

Please replace paragraph [00087] with the following replacement paragraph:

[00087] The diffracted ~~subfield~~ **partial field** is directed to a mirror **(S1)**~~(Si)~~, the reflected ~~subfield~~ **partial field** is directed to another mirror (S2). **The two** ~~Those~~ mirrors are used together with said grating as means for generating an interference pattern by superimposing the **partial fields** ~~part fields~~.

Please replace paragraph [00089] with the following replacement paragraph:

[00089] The mirrors reflect the ~~sub fields~~ **partial fields** back to the ~~said~~ grating **where** ~~and~~ the grating superimposes ~~will superimpose~~ the two **partial** fields by diffracting part of the ~~beforehand reflected sub field~~ **pre-reflected partial field** in the direction **of** ~~to~~ the detector and **also** reflecting the **pre-diffracted** ~~beforehand diffracted~~ sub field ~~also~~ in the direction to the detector. The resulting superposition of the ~~sub fields~~ **partial fields** generates the interference pattern.

Please replace paragraph [00090] with the following replacement paragraph:

[00090] At the same time the diffraction grating is used as means for changing the shape and the direction of propagation of both of the ~~sub-fields~~ **partial fields** depending on wavelength. The grating **functions as a** ~~resembles~~ a diffractive optical element for changing the shape or the direction of propagation of the wave front.

Please replace paragraph [00103] with the following replacement paragraph:

[000103] The shown beamsplitter is implemented as cubic splitter using a semitransparent mirror. ~~Said~~ **The** incoming single spatial mode of light is **split** ~~splitted~~ by amplitude into two ~~sub-fields~~ **partial fields**.

Please replace paragraph [00104] with the following replacement paragraph:

[000104] One of the ~~sub-fields~~ **partial fields** is the part of the field passing the semitransparent mirror. This **partial** field is directed to a **first** grating (G1). The other ~~sub-field~~ **partial field** is the part of the field reflected by the semitransparent mirror. This **partial** field is directed to ~~another~~ **a second** grating (G2).

Please replace paragraph [00106] with the following replacement paragraph:

[000106] The beamsplitter will then generate a superposition of the diffracted fields by reflecting part of the ~~sub-field~~ **partial field** diffracted by ~~one~~ **the first** grating (G1) to the detector and transmitting part of the ~~subfield~~ **partial field** diffracted by the **second** ~~other~~ grating (G2) also to the detector. The resulting superposition of the ~~sub-fields~~ **partial fields** generates the interference pattern.

Please replace paragraph [00109] with the following replacement paragraph:

[000109] The **presently described** embodiment further uses an phaseshifter (P) implemented as **an** actuator **for** translating the attached **second** grating (G2). An phaseshift of the ~~according subfield~~ **partial field** is performed ~~done~~ by translation of the **second** grating **(G2)** using ~~said~~ **the** Actuator.

Please replace paragraph [00115] with the following replacement paragraph:

[000115] Another advantage of the invention resulting from ~~the use of the means (M) for~~ coupling in a single ~~one~~ single spatial mode is the possibility to employ means for dividing the wavefront of ~~said~~ the single spatial mode to generate the ~~subfields~~ **partial fields**. One skilled in the art will recognize advantages associated with using ~~the The possibility to use~~ a wave front splitter instead of an amplitude splitter to allow ~~allows~~ for a broad range of new advantageous embodiments.

Please replace paragraph [00120] with the following replacement paragraph:

[000120] A portion of the wave is incident to a **first** diffraction grating (G1), another portion is incident to a **second** diffraction grating (G2), thus splitting the wavefront. ~~; the wavefront is thus split. Said~~ **The use of** ~~combination of said~~ two **combined** gratings serves as a beam splitter **for** splitting the wavefront of the incoming single spatial mode of light in to a **first** ~~subfield~~ **partial field** handled by one **of the two** grating (G1) and another ~~subfield~~ **partial field** handled by the other grating (G2).

Please replace paragraph [00121] with the following replacement paragraph:

[000121] The gratings **(G1) and (G2)** are arranged to diffract the fields back (Littrow-configuration of a grating) to a tiltable mirror (S) and generate a superposition of ~~said subfields~~ **the partial fields**.

Please replace paragraph [00123] with the following replacement paragraph:

[000123] While the gratings **(G1) and (G2)** introduce a strong angular deviation of the fields depending on wavelength it is a assumed that within a spectral range of the device the total deviation will stay small enough to allow a superposition of at least part of the ~~subfields~~ **partial fields**. In **the** case **where the** ~~of a too strong~~ angular deviation **is too strong,** the fields will miss each other and the detector and ~~we are~~ **be** out of spectral range. **This can be compensated for by** ~~By~~ rearranging the angular position of the gratings ~~this can be compensated for~~.

Please replace paragraph [00124] with the following replacement paragraph:

[000124] ~~Said~~ **The** mirror (S) reflects the ~~subfields~~ **partial fields** in a direction towards the detector (D) where the superposition of the ~~subfields~~ **partial fields** will generate the interference pattern. This resulting interference pattern is recorded by a detector.

Please replace paragraph [00125] with the following replacement paragraph:

[000125] In the **presently described** ~~shown~~ embodiment**,** the interference pattern itself is moved over the detector (scanned) by tilting said mirror (S). Each angular position of the tillable mirror represents a certain spatial position of the interference pattern hitting **the** ~~said~~ detector.

Please replace paragraph [00128] with the following replacement paragraph:

[000128] The **presently described** embodiment further uses an phaseshifter (P) implemented as actuator translating the attached grating (G2) for example, embodied as piezo-actuator as shown. A phaseshift of the ~~according subfield~~ **partial field** is performed ~~done~~ by translation of the grating **(G2)** using **the** ~~said~~ Actuator.

Please replace paragraph [00129] with the following replacement paragraph:

[000129] The performance capability of the apparatus and **associated** ~~of the~~ methods described **herein** can be substantially improved if the relative phase position of the ~~sub-fields~~ **partial fields** can be suitably influenced.

Please replace paragraph [00132] with the following replacement paragraph:

[000132] The interferometric apparatus may further take advantage of differences in the optical path lengths, at which the ~~sub-fields~~ **partial fields** are brought to interference. The interference patterns are then introduced only by components of the incident light with a high coherence length or the respective small bandwidth corresponding to **the** ~~said~~ differences in the optical path lengths.

Please replace paragraph [00141] with the following replacement paragraph:

[000141] ~~T~~**he** ~~Said~~ dispersive or diffractive optical element (D) will split the wavefront of the incoming single spatial mode of light in to a multitude of ~~subfields~~ **partial fields** showing different dependencies on wavelength.

Please replace paragraph [00145] with the following replacement paragraph:

[000145] At the position of the detector (CCD) the superposition of ~~said~~ **the** multitude of ~~subfields~~ **partial fields** will generate a complex and highly structured interference pattern ("speckle pattern") This resulting interference pattern is recorded by ~~said~~ **the** detector.

Please replace paragraph [00151] with the following replacement paragraph:

[000151] FIG. 5 illustrates an arrangement in which a plurality of subfields is generated and superimposed using an optical resonator.

Please replace paragraph [00157] with the following replacement paragraph:

[000157] The grating splits ~~said~~ **the** single permitted spatial mode of an incoming light field into two subfields: A first sub field is generated by reflection at the grating ("0-order of Diffraction") and is directed to the detector (CCD), a second sub field is generated by diffraction at the grating ("-l-st-order of Diffraction") and is directed back to ~~said~~ **the** semitransparent mirror (S).

Please replace paragraph [00158] with the following replacement paragraph:

[000158] By the semitransparent mirror a part of ~~said~~ **the** first sub field is reflected back to ~~said~~ **the** grating (G) again, where it is split again. One of the resulting further subfields is generated by reflection at the grating and directed to ~~said~~ **the** detector bringing it to superposition with ~~said~~ **the** first subfield. The other of ~~said~~ **the** resulting further subfields is generated by diffraction and directed back to ~~said~~ **the** semitransparent mirror (S) where the process repeats.

Please replace paragraph [00159] with the following replacement paragraph:

[000159] Thus the semitransparent mirror (S) and the grating (G) collectively form an optical resonator. Each iteration generates a further subfield directed to the detector. The resulting superposition of multiple subfields generates the interference pattern.

Please replace paragraph [00160] with the following replacement paragraph:

[000160] At the same time the grating represents means for changing the shape or the direction of propagation of the wavefront of at least one of ~~said~~ **the** ~~sub fields~~ **partial fields** in dependence on the wavelength causing different spectral components of ~~said~~ **the** single spatial mode of an incoming light field with different wavelengths to generate different of ~~said~~ **the** interference pattern.

Please replace paragraph [00170] with the following replacement paragraph:

[000170] Very complex interference patterns result from the shown multiple superposition of a multitude of the generated subfields. The numerical calculation of an optical spectrum or spectral properties of the light by correlating (cross-correlation) ~~said~~ **the** interference pattern with certain base patterns according to the above illustrated methods benefit by using ~~said~~ **the** complex interference patterns.

Please replace paragraph [00179] with the following replacement paragraph:

[000179] The grating is used as a beam splitter and ~~said~~ **the** incoming single spatial mode is splitted by amplitude into two ~~sub fields~~ **partial fields**. The grating creates one part field by diffracting (-1-st order of diffraction) part of the incoming field. The grating creates another part field by reflecting ("0-st" order of diffraction) part of the incoming field.

Please replace paragraph [00181] with the following replacement paragraph:

[000181] The diffracted subfield is directed to a mirror (Si), the reflected subfield is directed to another mirror (S2).

Please replace paragraph [00182] with the following replacement paragraph:

[000182] Those mirrors are used together with ~~said~~ **the** grating as means for generating an interference pattern by superimposing the part fields. The mirrors reflect the ~~sub fields~~ **partial fields** back to ~~said~~ **the** grating and the grating will superimpose the two fields by diffracting part of the beforehand reflected sub field in the direction to the detector and reflecting the beforehand diffracted sub field also in the direction to the detector.

Please replace paragraph [00183] with the following replacement paragraph:

[000183] The resulting superposition of the ~~sub fields~~ **partial fields** generates the interference pattern.

Please replace paragraph [00184] with the following replacement paragraph:

[000184] At the same time the diffraction grating is used as means for changing the shape and the direction of propagation of both of the ~~sub fields~~ **partial fields** depending on wavelength.

Please replace paragraph [00188] with the following replacement paragraph:

[000188] The embodiment further uses a phaseshifter (P) implemented as actuator translating the attached mirror (S2). A phaseshift of the according subfield is done by translation of the grating using ~~said~~ **the** actuator.

Please replace paragraph [00193] with the following replacement paragraph:

[000193] The grating is used as a beam splitter and ~~said~~ **the** incoming single spatial mode is split by amplitude into two ~~subfields~~ **partial fields**.

Please replace paragraph [00196] with the following replacement paragraph:

[000196] The diffracted subfield is directed to a mirror (S1), the reflected ~~subfield~~ **partial field** is directed to another mirror (S2).

Please replace paragraph [00197] with the following replacement paragraph:

[000197] Those mirrors are used together with ~~said~~ **the** grating as means for generating an interference pattern by superimposing the part fields. The mirrors reflect the subfields back to ~~said~~ **the** grating and the grating will superimpose the two fields by diffracting part of the beforehand reflected ~~subfield~~ **partial field** in the direction to the detector and reflecting the beforehand diffracted subfield also in the direction to the detector.

Please replace paragraph [00198] with the following replacement paragraph:

[000198] The resulting superposition of the ~~sub fields~~ **partial fields** generates the interference pattern.

Please replace paragraph [00199] with the following replacement paragraph:

[000199] At the same time the diffraction grating is used as means for changing the shape and the direction of propagation of both of the ~~sub fields~~ **partial fields** depending on wavelength.

Please replace paragraph [00207] with the following replacement paragraph:

[000207] The embodiment further uses an phaseshifter (P) implemented as actuator translating the attached mirror (S2). A phaseshift of the ~~according subfield~~ **partial field** is **performed** ~~done~~ by translation of the grating using ~~said~~ **the** actuator.